

construction methods

Stop leaks, start saving

By Jason Bakus

Precured silicone sealant in metal building applications

Precured sealant is produced by extruding an elastomeric sealant material and allowing it to cure to a flexible product in a controlled manufacturing environment. These materials are packaged in cured form, typically in rolls, and installed using a thin layer of adhesive near the edges to attach the material to the substrate (metal or other) being sealed. With the outer edges adhered to the substrate, the middle of the precured sealant, which is not bonded to the substrate, acts as the area for expansion and contraction. Precured sealants are manufactured in widths ranging from less than 1 inch (25 mm) to wider than 12 inches (305 mm). Examples of precured sealants are shown in Figure 1.

Keep Going

Several basic types of precured sealants are used in the construction market today, but silicone is the most commonly used. The reasons that silicone is the most common type of precured sealant used in the construction market are the same reasons that make silicone an ideal choice for metal building applications.

First, because of its molecular structure and high bond energy, silicone has excellent aging characteristics and is resistant to UV light and weathering. This gives silicone a longer life span than organic materials such as



Figure 1



Figure 2

EPDM, polyurethane, polysulfide and butyl, which are prone to degradation from UV exposure and weathering. In fact, there are silicone sealants that have been in place on building exteriors for more than 40 years and are still performing well. The longevity of precured silicone sealant allows for reduced maintenance costs over the life of the building.

In addition, the movement capability for silicone precured sealant can be as high as +200 percent/-75 percent, which is significantly higher than other products used in similar applications. This flexibility and high movement capability makes precured silicone sealant perfect for sealing areas with a large amount of thermal expansion and contraction, a situation commonly found in metal building applications. Additional advantages of silicone over other materials include a wide operational temperature range and better resistance to color fading, resulting in long-term, aesthetically pleasing appearance.

Figure 2 shows an example of a precured silicone sealant application on a metal roof joint between a new addition and an existing metal building. Because of the UV and weather resistance of this material, there is no need for a cover plate to protect it.

No Leaks

Perhaps the most groundbreaking feature of precured silicone sealant systems in metal building applications is the fact that they require no mechanical fasteners for installation. The strength of the adhesive allows the precured sealant to be installed with no other means of attaching the material to the substrate, even

when installed on a vertical surface. The effect of this feature is wide-reaching.

First, the installation of precured silicone sealant systems is quick and efficient, particularly when compared to other systems commonly used in these applications. Other systems, both all metal systems and other “membrane” systems, generally require many mechanical fasteners, as many as 1,500 fasteners per 100 linear feet (30 m) of material, often in addition to sealants and/or mastics. These fasteners dramatically increase the time and labor cost required for the installation of these systems. In addition, because each fastener creates another hole in the roof, the potential for leaks increases significantly.

Precured silicone sealant systems are currently being installed successfully in many different applications within metal buildings, including:

- Expansion joints (Figure 3)
- Roof-to-wall transitions (Figure 4)
- Roof height change details
- Joints between new and existing buildings (Figure 2)
- Ridge applications (Figure 5)
- Pipe and other penetrations
- Roof curb seals
- Many miscellaneous repair applications

More Uses

In addition to the applications discussed above, precured silicone sealant also is used in various repair applications, often related to metal roofing. One example of these applications is repairing holes in roof decking. Holes



Figure 3



Figure 4



Figure 5

in roofing material can be caused by any number of sources. Because precured silicone sealant can be cut into various shapes, these holes can be repaired and made watertight without the expense of removing and replacing entire roof panels. Figure 6 shows an example of a slotted screw hole repaired using a round cut out of precured silicone sealant.

Another repair application where precured silicone sealant can be especially useful is leaking or failed metal gutter seams. Because of its high flexibility, precured silicone sealant can bend at the corners of the gutter, allowing the material to be installed over existing failed gutter seam joints (Figure 7).

An example of a repair application where precured silicone sealant is used to seal the end of a metal standing-seam roof is shown in Figure 8.

The flexibility and high movement capability of precured silicone sealant allows it to be especially useful when sealing difficult details with complex configurations. An example of this type of application is the metal roof ridge trim to rake trim joint shown in Figure 9.

Custom Options

The use of a premium neutral-cure silicone adhesive sealant in the precured silicone sealant system allows the material to be bonded to a variety of metal substrates (without the use of a primer), including Galvalume, stainless steel, galvanized steel, Kynar coated, acrylic coated, aluminum and others.

Precured silicone sealant is available in many standard sizes and colors. Manufactur-

ers also offer custom color and custom design to fit an assortment of application requirements. Colors can be matched to various metal roofing finishes, allowing the material to blend into the roof system.

Finally, precured silicone sealant can help address an issue that is becoming important in the construction industry: The use of this material can help result in a greener building. Most buildings have numerous leaks in the building envelope, many of which are in the joint areas. Virtually any leak area in a building can be sealed using precured silicone sealant, resulting in greater energy efficiency. Improved energy efficiency and other factors allow precured silicone sealant to be an integral part of obtaining LEED certification for either new or existing buildings, particularly in the areas of minimum energy performance (prereq 2), optimize energy performance (Credit 1), low-emitting materials: adhesives & sealants (Credit 4.1) and thermal comfort: design (Credit 7.1).

Because of its numerous advantages, precured silicone sealant is being used more extensively in various industries, including metal building construction and repair. As leaders in the metal building industry realize the impact that cost savings and product performance can make in a variety of applications in both new construction and renovation projects, it is expected that the use of precured silicone sealant will continue to grow. **MBD**

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Figure 6

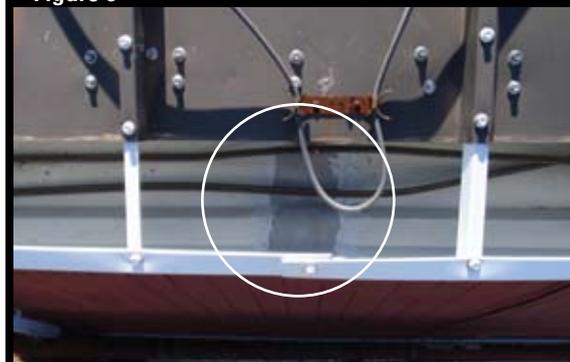


Figure 7



Figure 8



Figure 9